General

Title

Hip fracture mortality: percentage of in-hospital deaths per 1,000 discharges with hip fracture as a principal diagnosis for patients ages 65 years and older.

Source(s)

AHRQ QI research version 5.0. Inpatient quality indicator 19 technical specifications: hip fracture mortality rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 2 p.

National Quality Forum measure information: hip fracture mortality rate (IQI 19). Washington (DC): National Quality Forum (NQF); 2015 Jan 15. 13 p.

Measure Domain

Primary Measure Domain

Clinical Quality Measures: Outcome

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the percentage of in-hospital deaths per 1,000 discharges with hip fracture as a principal diagnosis for patients ages 65 years and older.

Rationale

Drawing from U.S. data on over 9,000 hip fractures identified in the 2008 National Sample Program (NSP) of the National Trauma Data Bank (NTDB), Belmont et al. (2014) determined in-hospital mortality rates among hip fracture patients to be 4.5%. A study of nationwide data from insurance companies covering 98% of the Austrian population found a similar in-hospital mortality rate of 3.6% for hip fracture patients over age 50 between 2008 and 2011 (Brozek et al., 2014). Looking specifically at patients who sustained

a unilateral open or closed femoral shaft fracture and underwent open or closed reduction and internal fixation between 2002 and 2006, another study by Cantu et al. (2014) using NTDB data found an in-hospital mortality rate of 1.4%.

Providers can adopt the processes of care of the best performing providers, or consumers can select the best performing providers in order to reduce the overall mortality rate.

Evidence for Rationale

Belmont PJ, Garcia EJ, Romano D, Bader JO, Nelson KJ, Schoenfeld AJ. Risk factors for complications and in-hospital mortality following hip fractures: a study using the National Trauma Data Bank. Arch Orthop Trauma Surg. 2014 May;134(5):597-604. PubMed

Brozek W, Reichardt B, Kimberger O, Zwerina J, Dimai HP, Kritsch D, Klaushofer K, Zwettler E. Mortality after hip fracture in Austria 2008-2011. Calcif Tissue Int. 2014 Sep;95(3):257-66. PubMed

Cantu RV, Graves SC, Spratt KF. In-hospital mortality from femoral shaft fracture depends on the initial delay to fracture fixation and Injury Severity Score: a retrospective cohort study from the NTDB 2002-2006. J Trauma Acute Care Surg. 2014 Jun;76(6):1433-40. PubMed

National Quality Forum measure information: hip fracture mortality rate (IQI 19). Washington (DC): National Quality Forum (NQF); 2015 Jan 15. 13 p.

Primary Health Components

Hip fracture; death; elderly

Denominator Description

Discharges, for patients ages 65 years and older, with a principal International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code for hip fracture (see the related "Denominator Inclusions/Exclusions" field)

Numerator Description

Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

A number of studies have shown a positive association between age and in-hospital mortality (Brozek et al., 2014; Cantu, Graves, & Spratt, 2014; Deiner, Westlake, & Dutton, 2014; Eschbach et al., 2013; Uzoigwe et al., 2013). A study of 2,056 patients presenting with neck of femur (NOF) fractures at

Leicester Royal Infirmary in the United Kingdom found that age was associated with an increased risk of in-hospital mortality (p less than 0.0001) (Uzoigwe et al., 2013). Using National Trauma Data Bank (NTDB) data, Cantu et al. (2014) found that age was a significant factor in mortality, with patients older than 65 years having significantly higher risks of dying in the hospital. This effect was most pronounced with delays in surgical timing. A large retrospective cohort study of data on U.S. patients undergoing surgery found that for patients over age 80, "treatment of fracture or dislocation of hip or femur" was among the types of procedures contributing the largest number of cases of in-hospital mortality, with rates of 0.9% (80 to 89 years) and 0.16% (age 90 years and older) in the oldest age groups examined (Deiner, Westlake, & Dutton, 2014). Brozek et al. (2014) found that in Austria, the overall in-hospital mortality rate among individuals over 94 years of age was as high as 8.9 % (95 % confidence interval [CI] 7.2 to 10.6 %). One small study focused in particular on outcomes associated with hip fracture repair in the very advanced age population. Eschbach et al. (2013) reported that among a sample of 402 patients age 60 and older from a single institution, patients over 90 years of age showed significantly increased short-term mortality, compared to 75- to 89-year-old patients (p = 0.014), but not when compared to 60- to 74-year-olds. However, in a multivariate regression model adjusting for common risk factors, increased age was not an independent risk factor for in-hospital mortality (p=0.132).

Multiple studies also reported a significant association between sex (male gender) and in-hospital mortality among hip fracture patients (Brozek et al., 2014; Uzoigwe et al., 2013; Auais et al., 2013; Belmont et al., 2014; Neuhaus et al., 2013). Uzoigwe et al. (2013) and Brozek et al. (2014) found male-gender was associated with an increased risk of in-hospital mortality (p less than 0.0001) and (p less than 0.001), respectively. Using multivariate logistic regression analysis, Belmont and coauthors (2014) also identified male sex as a major risk factor for mortality (OR 2.3; 95 % CI 1.6 to 3.4). Furthermore, another large U.S. study employing National Hospital Discharge Survey data also determined that male sex was one of the strongest predictors for in-hospital death (OR = 1.55; 95% CI 1.54 to 1.57) (Neuhaus et al., 2013).

Evidence for Additional Information Supporting Need for the Measure

Auais M, Morin S, Nadeau L, Finch L, Mayo N. Changes in frailty-related characteristics of the hip fracture population and their implications for healthcare services: evidence from Quebec, Canada. Osteoporos Int. 2013 Oct;24(10):2713-24. PubMed

Belmont PJ, Garcia EJ, Romano D, Bader JO, Nelson KJ, Schoenfeld AJ. Risk factors for complications and in-hospital mortality following hip fractures: a study using the National Trauma Data Bank. Arch Orthop Trauma Surg. 2014 May;134(5):597-604. PubMed

Brozek W, Reichardt B, Kimberger O, Zwerina J, Dimai HP, Kritsch D, Klaushofer K, Zwettler E. Mortality after hip fracture in Austria 2008-2011. Calcif Tissue Int. 2014 Sep;95(3):257-66. PubMed

Cantu RV, Graves SC, Spratt KF. In-hospital mortality from femoral shaft fracture depends on the initial delay to fracture fixation and Injury Severity Score: a retrospective cohort study from the NTDB 2002-2006. J Trauma Acute Care Surg. 2014 Jun;76(6):1433-40. PubMed

Deiner S, Westlake B, Dutton RP. Patterns of surgical care and complications in elderly adults. J Am Geriatr Soc. 2014 May;62(5):829-35. PubMed

Eschbach DA, Oberkircher L, Bliemel C, Mohr J, Ruchholtz S, Buecking B. Increased age is not associated with higher incidence of complications, longer stay in acute care hospital and in hospital mortality in geriatric hip fracture patients. Maturitas. 2013 Feb;74(2):185-9. PubMed

National Quality Forum measure information: hip fracture mortality rate (IQI 19). Washington (DC): National Quality Forum (NQF); 2015 Jan 15. 13 p.

Neuhaus V, King J, Hageman MG, Ring DC. Charlson comorbidity indices and in-hospital deaths in patients with hip fractures. Clin Orthop. 2013 May;471(5):1712-9. PubMed

Uzoigwe CE, Burnand HG, Cheesman CL, Aghedo DO, Faizi M, Middleton RG. Early and ultra-early surgery in hip fracture patients improves survival. Injury. 2013 Jun;44(6):726-9. PubMed

Extent of Measure Testing

Unspecified

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Hospital Inpatient

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Single Health Care Delivery or Public Health Organizations

Statement of Acceptable Minimum Sample Size

Does not apply to this measure

Target Population Age

Age greater than or equal to 65 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Aim

Better Care

National Quality Strategy Priority

Making Care Safer
Prevention and Treatment of Leading Causes of Mortality

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Safety

Data Collection for the Measure

Case Finding Period

Users may specify a time period; but the time period is generally one year.

Note: The signal variance parameters assume a one-year time period.

Denominator Sampling Frame

Patients associated with provider

Denominator (Index) Event or Characteristic

Clinical Condition

Institutionalization

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
Discharges, for patients ages 65 years and older, with a principal International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code for hip fracture

Note: Refer to the original measure documentation for ICD-9-CM codes.

Exclusions
Exclude cases:

With any-listed ICD-9-CM diagnosis codes for periprosthetic fracture
Transferring to another short-term hospital (DISP=2)
Major Diagnostic Categories (MDC) 14 (pregnancy, childbirth, and puerperium)
With missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1=missing)

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions
Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator

Exclusions
Unspecified

Numerator Search Strategy

Institutionalization

Data Source

Administrative clinical data

Type of Health State

Death

Instruments Used and/or Associated with the Measure

Unspecified

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Rate/Proportion

Interpretation of Score

Desired value is a lower score

Allowance for Patient or Population Factors

not defined yet

Description of Allowance for Patient or Population Factors

The predicted value for each case is computed using Generalized Estimating Equations (GEE) logistic regression and covariates for age (in 5-year age groups), All Patient Refined-Diagnosis Related Group (APR-DRG) and Major Diagnostic Categories (MDC). The reference population uses use 36 of the 45 states that participated in 2012, for a total of about 30 million hospital discharges from community hospitals). As defined by the American Hospital Association, community hospitals are all non-Federal, short-term, general or other specialty hospitals, excluding hospital units of institutions. Included among community hospitals are public and academic medical centers, specialty hospitals such as obstetrics-gynecology, ear-nose-throat, orthopedic and pediatric institutions. Short-stay rehabilitation, long-term acute care hospitals are excluded from the data used for the reported analyses. The expected rate is computed as the sum of the predicted value for each case divided by the number of cases for the unit of analysis of interest (i.e., county or state). The risk adjusted rate is computed using indirect standardization as the observed rate divided by the expected rate, multiplied by the reference population rate. The Smoothed Rate is the risk-adjusted rate shrunken to the volume specific rate and the prior year smoothed rate.

Refer to the original measure documentation for the specific covariates for this measure.

Standard of Comparison

not defined yet

Identifying Information

Original Title

IQI 19: hip fracture mortality rate.

Measure Collection Name

Agency for Healthcare Research and Quality (AHRQ) Quality Indicators

Measure Set Name

Inpatient Quality Indicators

Submitter

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Developer

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Funding Source(s)

Agency for Healthcare Research and Quality (AHRQ)

Composition of the Group that Developed the Measure

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicator (QI) measures are developed by a team of clinical and measurement experts in collaboration with AHRQ. The AHRQ QIs are continually updated as a result of new research evidence and validation efforts, user feedback, guidance from the National Quality Forum (NQF), and general advances in the science of quality measurement.

Financial Disclosures/Other Potential Conflicts of Interest

None

Endorser

National Quality Forum - None

NQF Number

not defined yet

Date of Endorsement

2015 Sep 3

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2015 Mar

Measure Maintenance

Measure is reviewed and updated on a yearly basis

Date of Next Anticipated Revision

Spring 2016 (version 6.0, including International Classification of Diseases, Tenth Revision, Clinical Modification [ICD-10-CM] and International Classification of Diseases, Tenth Revision, Procedure Coding System [ICD-10-PCS] compatible software)

Measure Status

This is the current release of the measure.

This measure updates a previous version: AHRQ QI. Inpatient quality indicators #19: technical specifications. Hip fracture mortality rate [version 4.4]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2012 Mar. 1 p.

Measure Availability

Source available from the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators (QI) Web site _____.

For more information, contact the AHRQ QI Support Team at E-mail: QIsupport@ahrq.hhs.gov; Phone: 301-427-1949.

Companion Documents

The following are available:

   AHRQ quality indicators. Inpatient quality indicators (IQI) parameter estimates [version 5.0]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 42 p. This document is available from the AHRQ Quality Indicators Web site _____.
   AHRQ quality indicators. Inpatient quality indicators benchmark data tables [version 5.0]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 22 p. This document is available from the AHRQ Quality Indicators Web site _____.
   AHRQ quality indicators. Inpatient quality indicators composite measure workgroup. Final report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Mar. various p. This document is available from the AHRQ Quality Indicators Web site _____.
   HCUPnet: a tool for identifying, tracking, and analyzing national hospital statistics. [Web site]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); [accessed 2015 Sep 10]. HCUPnet is available from the AHRQ Web site _____.

NQMC Status

This NQMC summary was completed by ECRI on December 4, 2002. The information was verified by the Agency for Healthcare Research and Quality on December 26, 2002.

This NQMC summary was updated by ECRI on April 7, 2004, August 19, 2004, and March 4, 2005. The information was verified by the measure developer on April 22, 2005.

This NQMC summary was updated by ECRI Institute on August 17, 2006, on May 29, 2007, on October 20, 2008 and on August 27, 2010.

This NQMC summary was reviewed and edited by ECRI Institute on July 13, 2011.

This NQMC summary was retrofitted into the new template on July 14, 2011.

This NQMC summary was updated by ECRI Institute on March 25, 2013 and again on December 9, 2015.

The information was verified by the measure developer on February 16, 2016.

Copyright Statement

No copyright restrictions apply.

Production

Source(s)

AHRQ QI research version 5.0. Inpatient quality indicator 19 technical specifications: hip fracture mortality rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 2 p.

National Quality Forum measure information: hip fracture mortality rate (IQI 19). Washington (DC): National Quality Forum (NQF); 2015 Jan 15. 13 p.

Disclaimer

NQMC Disclaimer

The National Quality Measures Clearinghouseâ„¢ (NQMC) does not develop, produce, approve, or endorse the measures represented on this site.

All measures summarized by NQMC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public and private organizations, other government agencies, health care organizations or plans, individuals, and similar entities.

Measures represented on the NQMC Web site are submitted by measure developers, and are screened solely to determine that they meet the NQMC Inclusion Criteria.

NQMC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or its reliability and/or validity of the quality measures and related materials represented on this site. Moreover, the views and opinions of developers or authors of measures represented on this site do not necessarily state or reflect those of NQMC, AHRQ, or its contractor, ECRI Institute, and inclusion or hosting of measures in NQMC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding measure content are directed to contact the measure developer.